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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/551,934	10/04/2005	Tsumoru Ohata	043888-0403	6449
53080 7590 05/25/2007 MCDERMOTT WILL & EMERY LLP 600 13TH STREET, NW WASHINGTON, DC 20005-3096			EXAMINER LEE, CYNTHIA K	
			ART UNIT 1745	PAPER NUMBER
			MAIL DATE 05/25/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/551,934

Applicant(s)

OHATA ET AL.

Examiner

Cynthia Lee

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 April 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,5,7,14,16-18,20-24,26-34,36 and 37 is/are pending in the application.
- 4a) Of the above claim(s) 33,34 and 37 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,5,7,14,16-18,20-24,26-32 and 36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

***Response to Arguments***

This Office Action is responsive to the amendment filed on 4/30/2007. Claims 1,5,7,13,14, 16-18, 20-24, 26-34, 36, and 37 are pending. Claims 33,34, and 37 are withdrawn from further consideration as being drawn to a non-elected invention. Applicant's arguments have been considered, but are not persuasive. Thus, claims 1,5,7,13,14, 16-18, 20-24, 26-32, 36 are finally rejected for reasons of record.

***Note***

The status identifiers for claims 33, 34, and 37 are incorrect. Applicant is advised to correct the status identifiers to appropriately reflect the status of the abovementioned claims.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 7, 27-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Delnik (US 5948464) in view of Maeda (US 2003/0113626).

Delnik discloses a lithium ion battery comprising a positive and negative electrode, and a porous film interposed between the two electrodes. The porous film comprises solid particulates (applicant's filler) and a polymer binder (applicant's resin binder). The separator ink is formulated to contain a ratio of polymer binder to solid

Art Unit: 1745

particulate material ranging preferably from about 5/95 to 10/90 (7:25-26). The solid particulates include alumina (6:48) (instant claims 7, 29).

Delnik does not disclose a binder comprising core-shell type rubber particles having an adhesive surface portion including at least an acrylonitrile, an acrylate, or a methacrylate unit (claims 1, 16, 17, 21, 23, 28). Maeda teaches a binder comprising a core-shell type rubber particles [0028]. The rubber particles include acrylonitrile, acrylate, or a methacrylate [0043, 0044, 0046]. The surface of the particles necessarily is adhesive because it is a binder. It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Maeda's binders to Delnik's separator ink for the benefit of imparting a well-balanced binding power and binding durability [0009]. Further, it has been held by the court that the selection of a known material based on its suitability for its intended use is *prima facie* obvious. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07.

Regarding claim 27, the amount of resin binder on one side is necessarily smaller than the second side because the particles are so small that it is not possible to have equal amounts on both sides without a controlled method of applying the separator ink.

Regarding claims 30 and 31, The Examiner notes that Maeda discloses polyacrylonitrile as one of the polymers [0046] and it possesses a melting temperature of 317 C (see attached). The Examiner notes that the decomposition temperature is necessarily higher than the melting temperature.

Regarding claim 32, Delnik discloses that the separator ink was first printed onto the electrode plate and dried in a vacuum oven at a temperature range of 90 to 130 C to remove the solvent (8:10-15). Since Applicants disclose that gradual increase in the binder concentration gradient is achieved by drying the mixture between 100 C and 180 C, Delnik modified by Maeda necessarily has a gradual increase in the binder content from first side to second side. MPEP states that prior art which teaches a range overlapping or touching the claimed range anticipates if the prior art range discloses the claimed range with "sufficient specificity." See 2131.03.

Claims 14, 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Delnik (US 5948464) in view of Maeda (US 2003/0113626) as applied to claims 1 and 27 above, further in view of Murai (US 2002/0048704).

Delnick modified by Maeda teaches a porous film, but does not teach a porous film and a separator. However, Murai teaches of a separator made of an electrically insulating material that has sufficient strength, such as porous film, net, and nonwoven fabric. While not limiting, a single layer or multilayer porous film of polyethylene or polypropylene is preferred [0030]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to add a layer or a plurality of layers of polyethylene or polypropylene to Delnik's porous composite separator layer modified by Maeda for the benefit of increasing the insulation and strength of the separator to avoid short circuiting. It has been held by the court that the selection of a known material

Art Unit: 1745

based on its suitability for its intended use is *prima facie* obvious. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07.

Delnick modified by Maeda does not teach a wound battery. However, Murai teaches a wound battery (fig. 3 and 4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a wound battery of Delnick modified by Maeda for the benefit of shaping the battery suitable for the intended application.

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Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Delnik (US 5948464) in view of Maeda (US 2003/0113626) as applied to claim 1 and incorporated herein, further in view of Sheibley (US 4371596).

Delnik does not disclose the filler comprising a mixture of a large particle group and a small particle group. Sheibley teaches a separator comprising a filler material with two distinct particle sizes so that the smaller particles fit or pack within the interstices between the larger particles. The pores are created through the highly tortuous pathway of plasticizer between the well-packed filler particles. The pore size depends upon the surface area of the fillers (4:10-20). Sheibley teaches that the particle size groups are 0.01 to 0.02 microns and 0.1 to 0.2 microns (5:55-60). It would have been obvious to one of ordinary skill in the art at the time the invention was made

Art Unit: 1745

to modify Delnik's filler material with two distinct particle sizes, as taught by Sheibley, for the benefit of better packing the particles as well as to vary the pore size.

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Claims 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Delnik (US 5948464) in view of Maeda (US 2003/0113626), further in view of Sheibly (US 4371596).

Delnik discloses a lithium ion battery comprising a positive and negative electrode, and a porous film interposed between the two electrodes. The porous film comprises solid particulates (applicant's filler) and a polymer binder (applicant's resin binder). The separator ink is formulated to contain a ratio of polymer binder to solid particulate material ranging preferably from about 5/95 to 10/90 (7:25-26). The solid particulates include alumina (6:48) (instant claims 24).

Delnik does not disclose a binder comprising core-shell type rubber particles having an adhesive surface portion including at least an acrylonitrile, an acrylate, or a methacrylate unit (claims 21, 23). Maeda teaches a binder comprising a core-shell type rubber particles [0028]. The rubber particles include acrylonitrile, acrylate, or a methacrylate [0043, 0044, 0046]. The surface of the particles necessarily is adhesive because it is a binder. It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Maeda's binders to Delnik's separator ink for the benefit of imparting a well-balanced binding power and binding durability [0009]. Further, it has been held by the court that the selection of a known material based on its

suitability for its intended use is *prima facie* obvious. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07.

Delnik does not disclose an elongating percentage of said porous film is 15% or more (instant claim 21). Sheibley teaches a separator comprising a filler material with two distinct particle sizes so that the smaller particles fit or pack within the interstices between the larger particles. The pores are created through the highly tortuous pathway of plasticizer between the well-packed filler particles. The pore size depends upon the surface area of the fillers (4:10-20). Sheibley teaches that the particle size groups are 0.01 to 0.02 microns and 0.1 to 0.2 microns (5:55-60). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Delnik's filler material with two distinct particle sizes, as taught by Sheibley, for the benefit of better packing the particles as well as to vary the pore size.

Regarding claim 21, the Examiner notes that the elongating percentage of the porous film depends on the amount of binder as well as the filler particle size ratio (see [0195] of instant application PGPUB US 2006/0216608). Thus, the combination of Delnik modified by Maeda and Sheibly would necessarily have an elongating percentage of said porous film of 15% or more.

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Delnik (US 5948464) in view of Maeda (US 2003/0113626), further in view of Sheibly (US 4371596) as applied to claim 21, further in view of Murai (US 2002/0048704).

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Delnick modified by Maeda and Sheibly teaches a porous film, but does not teach a porous film and a separator. However, Murai teaches of a separator made of an electrically insulating material that has sufficient strength, such as porous film, net, and nonwoven fabric. While not limiting, a single layer or multilayer porous film of polyethylene or polypropylene is preferred [0030]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to add a layer or a plurality of layers of polyethylene or polypropylene to Delnik's porous composite separator layer modified by Maeda and Sheibly for the benefit of increasing the insulation and strength of the separator to avoid short circuiting. It has been held by the court that the selection of a known material based on its suitability for its intended use is *prima facie* obvious. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07.

Delnick modified by Maeda does not teach a wound battery. However, Murai teaches a wound battery (fig. 3 and 4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a wound battery of Delnick modified by Maeda for the benefit of shaping the battery suitable for the intended application.

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Art Unit: 1745

Claims 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Delnik (US 5948464) in view of Maeda (US 2003/0113626) and Call (US 2002/0136945).

Delnik discloses a lithium ion battery comprising a positive and negative electrode, and a porous film interposed between the two electrodes. The porous film comprises solid particulates (applicant's filler) and a polymer binder (applicant's resin binder). The separator ink is formulated to contain a ratio of polymer binder to solid particulate material ranging preferably from about 5/95 to 10/90 (7:25-26). The solid particulates include alumina (6:48) (instant claims 7, 18, 24, 29).

Delnik does not disclose a binder comprising core-shell type rubber particles having an adhesive surface portion including at least an acrylonitrile, an acrylate, or a methacrylate unit (claims 16, 17). Maeda teaches a binder comprising a core-shell type rubber particles [0028]. The rubber particles include acrylonitrile, acrylate, or a methacrylate [0043, 0044, 0046]. The surface of the particles necessarily is adhesive because it is a binder. It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Maeda's binders to Delnik's separator ink for the benefit of imparting a well-balanced binding power and binding durability [0009]. Further, it has been held by the court that the selection of a known material based on its suitability for its intended use is *prima facie* obvious. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07.

Delnik modified by Maeda does not teach an average pore size of micropores in said porous film is 0.02 to 0.09  $\mu\text{m}$  (claim 16). Call teaches a microporous separator

Art Unit: 1745

having pore size of from about 0.01 to 5 microns [0029]. Microporous battery separators are used to allow electrolytes to cross through the battery separators while preventing any contact between electrodes [0003]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Delnik modified by Maeda to have the pore size as taught by Call for the benefit of controlling the amount for electrolyte flowing through the separator.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Delnik (US 5948464) in view of Maeda (US 2003/0113626) and Call (US 2002/0136945) as applied to claim 16, further in view of Murai (US 2002/0048704).

Delnick modified by Maeda and Call teaches a porous film, but does not teach a porous film and a separator. However, Murai teaches of a separator made of an electrically insulating material that has sufficient strength, such as porous film, net, and nonwoven fabric. While not limiting, a single layer or multilayer porous film of polyethylene or polypropylene is preferred [0030]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to add a layer or a plurality of layers of polyethylene or polypropylene to Delnik's porous composite separator layer modified by Maeda and Call for the benefit of increasing the insulation and strength of the separator to avoid short circuiting. It has been held by the court that the selection of a known material based on its suitability for its intended use is *prima facie* obvious. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07.

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Art Unit: 1745

Delnick modified by Maeda does not teach a wound battery. However, Murai teaches a wound battery (fig. 3 and 4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a wound battery of Delnick modified by Maeda for the benefit of shaping the battery suitable for the intended application.

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### ***Response to Arguments***

Applicant's arguments filed 4/30/2007 have been fully considered but they are not persuasive.

*Applicant argues that Maeda describes a long list of binders for use in **battery electrodes**, an active component of the battery. Applicant argues there is no suggestion to select the specifically claimed binders for use in a **porous film**, an inactive component of the battery (emphasis in original). Pg. 10 of Response.*

The Examiner notes that regardless of the application of a binder, a binder necessarily functions to adhere materials together. Maeda teaches that the binder imparts a well-balanced binding power and a binding durability (see abstract) and it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the Maeda's binder in various applications that desire binding power and durability.

*Applicant argues that Maeda's binder is dispersed in a liquid that does not dissolve the binder. Applicant argues that Delnick, on the other hand, is practiced by dissolving the binder in a liquid. When the Maeda binder is dissolved in a liquid, its particle structure is destroyed. Therefore, the binder of Maeda cannot be used according to the teaching of Delnick. Pg. 11 of Response.*

The Examiner notes that the combination of Delnick and Maeda would not combine Maeda's binders dissolving in Delnick's separator solution because Maeda's binder does not dissolve. Maeda teaches of using the binders in a slurry and thus, It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the separator of Delnick modified by Maeda in various ways to make the invention, such as mixing the solid particulate with a binder in slurry, as taught by Maeda.

*Applicant argues that the Examiner has no basis for asserting that the amount of resin binder is necessarily smaller on one side versus the other side. Pg. 11 of Response.*

The Examiner notes that on a microscopic level, the amount of the resin binder is necessarily smaller on one side versus the other side without a controlled method of application. Absent any specifics of what is meant by "smaller," its broadness is met by Delnick in view of Maeda.

*Applicant argues that none of the references suggest an elongating percentage of the porous film is 15% or more, as required by claim 21. Applicant argues that Sheibley pertains to a porous film of alkaline batteries and Delnick pertains to the lithium ion secondary batteries. Applicant argues that it is clear that the elongating percentage of the porous film of lithium ion secondary batteries is not obvious, when the teaching of Sheibley is considered as a whole. Pg. 15 of Response.*

The Examiner reiterates that the elongating percentage of the porous film depends on the amount of binder as well as the filler particle size ratio (see [0195] of instant application PG PUB US 2006/0216608). Thus, the combination of Delnik modified by Maeda and Sheibly would necessarily have an elongating percentage of said porous film of 15% or more. Applicants have not pointed out any errors in the Examiner's position.

The Examiner notes that both Sheibly and Delnick both pertain to a common art of batteries, and thus the combination is proper.

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**Conclusion**

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Art Unit: 1745

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Lee whose telephone number is 571-272-8699. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's trainer, Susy Tsang-Foster can be reached on 571-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.


Art Unit: 1745

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ckl

Cynthia Lee

Patent Examiner

  
SUSYTSANG-FOSTER  
PRIMARY EXAMINER